

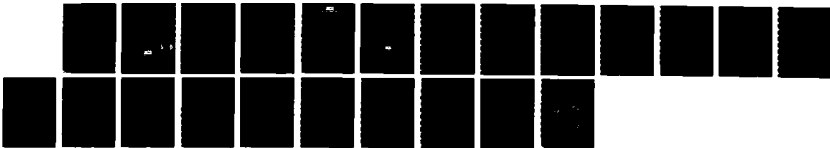
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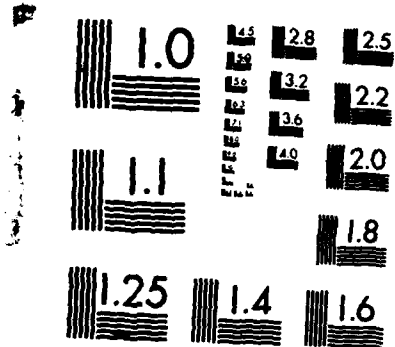
DATA AND PRELIMINARY EMPIRICAL RESULTS FOR SELRES
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RESEARCH MEMORANDUM

DATA AND PRELIMINARY EMPIRICAL RESULTS FOR SELRES AFFILIATION ANALYSES

Beth J. Asch

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1. Enclosure (1) is forwarded as a matter of possible interest and for comment.
2. This Research Memorandum documents the initial data analysis phase of a project to determine the effect of bonuses on affiliation rates. For further information, contact Dr. Jean Fletcher (824-2330).

Robert F. Lockman

ROBERT F. LOCKMAN
Director
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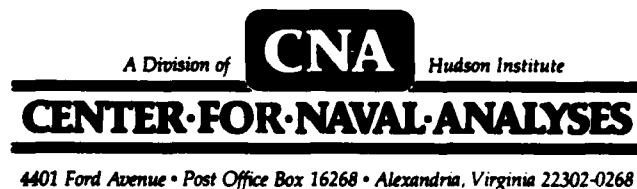


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DATA AND PRELIMINARY EMPIRICAL RESULTS FOR SELRES AFFILIATION ANALYSES

Beth J. Asch

Naval Planning, Manpower, and Logistics Division



ABSTRACT

This Research Memorandum examines Navy veteran affiliations to the Selected Reserve. Affiliation rates by rating are calculated using national data. These affiliation rates are shown to vary across rating, RAMOS category, and bonus eligibility.

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INTRODUCTION

This paper summarizes some preliminary empirical work generated while estimating the effect of pay and bonuses on Selected Reserve (SELRES) affiliation rates. The background of the Reserve supply problem is discussed in detail in the companion paper, [1]. The preliminary results include: The distribution of 1-year affiliation rates across ratings; the distribution of leaving time from active duty to gaining time to the Reserves; the relationship between bonuses and 1-year affiliation rates; and the relationship between RAMOS (Reserve Recruiting and Manning Objective System) categories and affiliation rates.

The data used in the analysis come from two sources. The first consists of monthly observations on individuals leaving the Navy from FY 1980 through FY 1983, which were obtained from the Defense Manpower Data Center's (DMDC) retention file. These data are matched by Social Security number to the second data source, which consists of observations on individuals who affiliated with the Selected Reserve from FY 1980 through FY 1984. These data on SELRES affiliations were obtained from the Reserve Components Common Personnel Data System. By matching the two data sources, it can be ascertained which Navy veterans (NAVETs) were affiliated with the Reserves after leaving active duty.

AFFILIATION RATES

This analysis focuses only on NAVET affiliations occurring within 1 year of leaving active duty. As shown in [2], most NAVETs affiliate in this period. Table 1 (reproduced from [2]) presents estimated affiliation rates for NAVETs in sea-going ratings. The 1-year affiliation is defined as the probability a NAVET affiliates with SELRES within -6 to 12 months of leaving active duty. The 1-year affiliation rate is defined over the 18-month period, -6 to 12 months, because some NAVETs join SELRES while in their last months of active duty. The 2-year affiliation rate is defined as the probability a NAVET affiliates with SELRES within 12-24 months. The 3-year and 4-year affiliation rates are defined in a similar manner. The table shows that the 1-year affiliation rate is .20, whereas the 2-year affiliation rate is only .03.

Table 2 gives the distribution of NAVET affiliations by number of months between leaving active duty and joining SELRES. The table shows that the majority of affiliations occur either at the time the NAVET leaves active duty or within 6 months of departure.

TABLE 1
ESTIMATED NAVET AFFILIATION RATES
FOR SEA-GOING RATINGS

<u>Years since leaving active duty</u>	<u>Affiliation rate</u>
1	.20
2	.03
3	.02
4	.01

TABLE 2
NAVET AFFILIATIONS WITH SELRES
AFTER LEAVING ACTIVE DUTY
(FY 1980 - FY 1983)

<u>Number of months</u>	<u>Number of NAVET affiliations</u>
-6	5
-5	5
-4	4
-3	2
-2	7
-1	35
0	8,043
1	10,158
2	5,638
3	3,547
4	1,881
5	1,409
6	1,154
7	994
8	840
9	744
10	691
11	672
12	650

DEMAND CONSTRAINTS

As discussed in [1], an important consideration when estimating Reserve supply is the existence of demand constraints. These must be accounted for when estimating Reserve supply; otherwise, biased estimates of the pay elasticity will result. Supply is constrained by demand when it exceeds demand at a given level of compensation. Observed enlistments will therefore lie along the demand curve. The estimated slope coefficient of the supply curve will be biased if the data include these observations.

An important demand constraint on Reserve supply is shown in [1] to be caused by the Naval Reserve's RAMOS. This system was developed to identify and place controls on ratings that have historically been oversupplied or undersupplied. Each quarter, the Navy uses national data to compare the number of billets available in each rating to the number filled. Ratings are then placed into RAMOS categories based on the degree of oversupply or shortage. Ratings less than 80-percent manned are in group A; ratings 80- to 89-percent manned are in group B; ratings 90- to 100-percent manned are in group C; ratings 101- to 110-percent manned are in group D; and ratings over 110-percent manned are in group E.

When a rating is in category A, B, or C, new individuals are recruited into the rating. No new recruits are permitted when RAMOS is D or E unless recruiters have permission from Commander, Naval Reserve Force (COMNAVRESFOR).

Because the analysis is based on time-series, cross-section data, observed enlistments will fall into one of three cases. In case 1, all enlistments for a given rating are observed when RAMOS is A, B, or C. Since none of the enlistments are demand constrained, the observations will trace out a supply curve. The estimation of the pay elasticity in this case simply requires estimating the supply function for the rating and transforming the slope coefficient on pay to a pay elasticity.

In case 2, all the enlistments for a given rating are observed during periods when RAMOS is D or E. All of the enlistments are demand constrained. The observations will trace out a vertical line centered near but not at zero, since a few enlistments occur even when RAMOS is D or E. The pay elasticity in this case is derived using the estimated parameters of the supply function in case 1 (the unconstrained case) to predict the demand-constrained behavior in case 2.

In case 3, some enlistments occur in periods when RAMOS is A, B, or C, and some enlistments are demand constrained and some are not. Enlistments that occur when RAMOS is A, B, or C trace out a supply curve, and enlistments that occur when RAMOS is D or E trace out a vertical line centered near zero. Using all of the observations to estimate the supply function would produce a biased estimate of the pay elasticity because some of the observations are demand constrained. An unbiased pay elasticity can be estimated by throwing out the enlistments

observed when RAMOS is D or E and estimating the supply function using the unconstrained observations.

The distribution of ratings across cases favors case 1. Approximately 53 percent of the ratings fall into case 1, approximately 18 percent fall into case 2, and approximately 28 percent fall into case 3.

The probability of affiliating with SELRES by rating, along with the associated RAMOS case, is given in table 3. As the table shows, affiliation rates vary considerably. The affiliation rate for the AB, AF, AM, AV, FT, and GM ratings is zero. Since individuals in these ratings must be in the higher pay grades, E8 or E9, few USN losses and affiliations occur in these ratings.

The affiliation rate for the AW rating is .45. The mean value for all ratings is .25 with a standard deviation of .11. These differences in affiliation rates across ratings are systematic. High-skill ratings, ones that require extra schooling, tend to have lower affiliation rates. Table 4 lists the highly technical ratings and their associated affiliation rates.

Of the 18 high-skill ratings, only 4 have affiliation rates that are above the mean, .25, for all ratings. The mean affiliation rate for the high-skill ratings only is .18, with a standard deviation of .10.

The affiliation rates were calculated by including observations made when RAMOS was D or E. Therefore, for those ratings that had periods when RAMOS was D or E, the affiliation rates are underestimated. This fact is verified by estimating the correlation between affiliation rates and RAMOS category. If a dummy variable is assigned a value of 5 if RAMOS is A, a value of 4 if RAMOS is B, a value of 3 if it is C, and so on, the correlation between this dummy variable and affiliation rates is .35, which is both positive and significant. This evidence indicates the importance of accounting for demand constraints in this work.

Affiliation rates vary with affiliation bonuses. Ratings that were eligible for affiliation bonuses have higher affiliation rates than those that were ineligible. The correlation coefficient between affiliation rates and a dummy variable, indicating whether or not a given rating was eligible for a bonus over most of the sample period, is .24. Table 5 lists the ratings and the periods between FY 1982 through FY 1984 in which they were eligible for affiliation bonuses.

TABLE 3
SELRES AFFILIATION RATES BY RATING

<u>Rating</u>	<u>Affiliation rate</u>	<u>RAMOS case</u>
AB	.00	1
AF	.00	1
AM	.00	3
AV	.00	2
FT	.00	1
GM	.00	1
FTB	.03	2
MT	.06	2
DS	.09	1
NC	.09	2
STS	.10	2
FTM	.13	1
ET	.14	1
BT	.16	3
MM	.16	3
CTM	.17	1
EM	.17	3
EW	.17	1
IC	.17	2
AQ	.18	3
GSE	.18	1
PC	.18	2
STG	.18	3
FTG	.19	1
SH	.19	2
ABE	.21	2
ABH	.21	2
OM	.21	1
ABF	.22	2
DM	.22	1
LI	.22	2
GSM	.23	3
AC	.24	1
ASM	.24	3
MA	.24	3
AE	.25	3

TABLE 3 (Continued)

<u>Rating</u>	<u>Affiliation rate</u>	<u>RAMOS case</u>
AMS	.25	3
ASH	.25	1
AZ	.25	2
MR	.25	3
OS	.25	1
AME	.26	3
CTA	.26	3
HT	.26	1
ML	.26	1
MS	.26	1
AT	.28	1
CTR	.28	1
EN	.28	3
GMM	.28	1
GMT	.28	1
IM	.28	1
AX	.29	1
DP	.29	3
AMH	.30	3
DK	.30	2
GMG	.30	1
BM	.31	1
CE	.31	1
CTO	.31	3
OT	.31	1
PM	.31	3
PR	.31	1
AS	.32	1
ASE	.32	3
SM	.32	1
TM	.32	1
AG	.33	1
QM	.33	1
RM	.33	1
AD	.34	3
CTT	.34	3
JO	.34	3
PH	.34	2
SK	.34	3
AK	.34	3

TABLE 3 (Continued)

<u>Rating</u>	<u>Affiliation rate</u>	<u>RAMOS case</u>
AO	.35	1
RP	.35	3
BU	.36	1
CTI	.36	1
PN	.37	2
EO	.38	1
LN	.38	1
MN	.38	1
YN	.38	3
CM	.39	1
DT	.39	1
HM	.39	1
AN	.41	1
SN	.41	1
SW	.41	1
UT	.41	1
FN	.43	1
IS	.43	1
EA	.44	1
AW	.45	1

TABLE 4

AFFILIATION RATES FOR HIGH-SKILL RATINGS

<u>Rating</u>	<u>Affiliation Rate</u>
FTB	.03
MT	.06
DS	.09
STS	.10
FTM	.13
ET	.14
CTM	.17
EW	.17
AQ	.18
STG	.18
FTG	.19
AC	.24
AE	.24
AT	.28
AX	.29
CTT	.34
CTI	.36

TABLE 5
RATINGS ELIGIBLE FOR AFFILIATION BONUSES
(FY 1982 - FY 1984)

Rating	Date								
	<u>03/82</u>	<u>07/82</u>	<u>10/82</u>	<u>01/83</u>	<u>04/83</u>	<u>08/83</u>	<u>11/83</u>	<u>01/84</u>	<u>08/84</u>
AB									
ABE						X	X	X	X
ABF						X	X	X	X
ABH									
AC	X	X	X	X	X	X	X	X	X
AD									
ADR									
AE									
AF									
AG	X	X	X	X	X	X	X	X	X
AK	X	X	X	X	X	X	X	X	X
AM									
AME									
AMH									
AMS									
AN									
AO									
AQ	X	X	X	X	X	X	X	X	X
AS									
ASE									
ASH									
ASM									
AT									
AV									
AW	X	X	X	X	X	X	X	X	X
AX	X	X	X	X	X	X	X	X	X
AZ									

TABLE 5 (Continued)

Rating	Date									
	<u>03/82</u>	<u>07/82</u>	<u>10/82</u>	<u>01/83</u>	<u>04/83</u>	<u>08/83</u>	<u>11/83</u>	<u>01/84</u>	<u>08/84</u>	
BM	X	X	X	X	X	X	X	X	X	
BT										
BU	X	X	X	X	X	X	X	X	X	
CE										
CM	X	X	X	X	X	X	X	X	X	
CN										
CTA										
CTI	X	X	X	X	X	X	X	X	X	
CTM	X	X	X			X	X	X	X	
CTO	X	X	X	X	X	X	X	X	X	
CTR	X	X	X	X	X	X	X	X	X	
CTT				X	X	X	X	X	X	
CU										
DK										
DM										
DP										
DS	X	X	X	X	X					
DT	X	X	X	X	X					
EA				X	X	X	X	X	X	
EM										
EN										
EO	X	X	X	X	X	X	X	X	X	
EQ										
ET				X	X					
ETR										
EW	X	X	X	X	X	X	X	X	X	
FN										
FT										
FTB										
FTG	X	X	X	X	X	X	X	X	X	
FTM	X	X	X	X	X	X	X	X	X	

TABLE 5 (Continued)

Rating	Date									
	<u>03/82</u>	<u>07/82</u>	<u>10/82</u>	<u>01/83</u>	<u>04/83</u>	<u>08/83</u>	<u>11/83</u>	<u>01/84</u>	<u>08/84</u>	
GM										
GMG	X	X	X	X	X	X	X	X	X	X
GMM	X	X	X	X	X	X	X	X	X	X
GMT	X	X	X	X	X	X	X	X	X	X
GS										
GSE				X	X	X	X	X	X	X
GSM				X	X	X	X	X	X	X
HM	X	X	X	X	X	X	X	X	X	X
HT				X	X	X	X	X	X	X
IC										
IM				X	X	X	X	X	X	X
IS	X	X	X	X	X	X	X	X	X	X
JO										
LI										
LN				X	X	X	X	X	X	X
MA										
ML	X	X	X	X	X	X	X	X	X	X
MM										
MN	X	X	X	X	X	X	X	X	X	X
MR										
MS	X	X	X							
MT										
MU										
NC										
OM	X	X	X	X	X	X	X	X	X	X
OS	X	X	X	X	X	X	X	X	X	X
OT	X	X	X	X	X	X	X	X	X	X
OTA										
OTM										

TABLE 5 (Continued)

Rating	Date								
	<u>03/82</u>	<u>07/82</u>	<u>10/82</u>	<u>01/83</u>	<u>04/83</u>	<u>08/83</u>	<u>11/83</u>	<u>01/84</u>	<u>08/84</u>
PC									
PH									
PI									
PM									
PN									
PR	X	X	X						
QM	X	X	X	X	X	X	X	X	X
RM	X	X	X	X	X	X	X	X	X
RP									
SH									
SK	X	X	X	X	X	X	X	X	X
SM	X	X	X	X	X	X	X	X	X
SN									
ST									
STG	X	X	X	X	X				
STS									
SW	X	X	X	X	X	X	X	X	X
TD									
TM	X	X	X	X	X	X	X	X	X
UT									
YN						X	X	X	X

NOTE: A small number of ratings were eligible for bonuses for part of FY 1981. However, this historical information appears to be lost. March 1982 data are from NMPC; the remainder are from COMNAVRESFOR.

Bonuses were particularly predominant among the sea-going ratings. The sea-going ratings are as follows: BM, BT, EM, EN, ET, EW, FN, FTG, GMG, GMT, GSE, HT, IC, MA, MM, MR, OS, QM, RM, SM, SN, STG, and TM. These ratings also tend to have higher-than-average affiliation rates. Of the sea-going ratings, 10 have affiliation rates below the mean of .25, and 15 have affiliation rates above the mean.

SUMMARY AND CONCLUSIONS

NAVET affiliation rates to SELRES were calculated by rating using national data. These affiliation rates were found to vary considerably across ratings. Technical ratings had lower affiliation rates than nontechnical ratings. The affiliation rates were also found to vary with affiliation bonuses. Ratings that were eligible for a bonus tended to have higher affiliation rates than those that were not. This finding indicates that bonuses are an effective policy tool for increasing SELRES affiliation.

The Naval Reserve's recruiting system, RAMOS, also affects affiliation rates. Ratings in RAMOS category A, a situation of extreme shortage, had higher affiliation rates than ratings in category E. RAMOS's influence on affiliation rates must, therefore, be accounted for when estimating the supply of NAVETs in SELRES.

REFERENCES

- [1] CNA, Research Memorandum 86-42, "Estimating the Effect of Pay on Selected Reserve Supply," by Beth J. Asch, Unclassified, Feb 1986
- [2] CNA, Research Memorandum 85-73.10, "Manning the Naval Reserve Force," by Beth J. Asch, Unclassified, Oct 1985

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